

**This Page Is Inserted by IFW Operations
and is not a part of the Official Record**

BEST AVAILABLE IMAGES

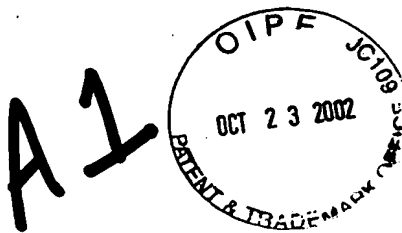
Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- **BLACK BORDERS**
- **TEXT CUT OFF AT TOP, BOTTOM OR SIDES**
- **FADED TEXT**
- **ILLEGIBLE TEXT**
- **SKEWED/SLANTED IMAGES**
- **COLORLED PHOTOS**
- **BLACK OR VERY BLACK AND WHITE DARK PHOTOS**
- **GRAY SCALE DOCUMENTS**

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**



Japanese Utility Model Examined Publication No. H04-37635

(57) Scope of Claim for Utility Model Registration

An air jet gun, being configured to allow air supplied from a compressor or the like to be jetted from a leading end nozzle part by an opening/closing operation of an opening/closing valve device and comprising a flow rate control mechanism that is provided for the opening/closing valve device and can control a flow rate of the air to be jetted from the nozzle part, wherein the opening/closing valve device is provided, in an air path through which the air flows, while an opening/closing valve capable of opening and closing the air path is attached to a valve rod whose one end projects outward, the opening/closing valve device is configured with a push button, which allows the opening/closing valve to make an opening/closing movement, attached to an end portion projecting outward of the valve rod, and the flow rate control mechanism includes a tapered flow rate control valve provided in a part on a side of the opening/closing valve of the valve rod and a stopper that can be screwed to adjust an amount of movement of the operation button for a push operation to an arbitrary amount of movement.

Detailed Description of the Device

[Field of the Industrial Application]

The present device relates to an air jet gun used, for example, when air supplied from a compressor or the like is jetted to clean and remove dirt and dust.

[Prior Art]

Conventionally, an opening/closing valve device of such a type of air jet gun configured to allow air supplied from a compressor or the like to be jetted from a leading end nozzle part through an opening/closing operation of the opening/closing valve device is simply provided, in an air path through which the air flows, with an opening/closing valve, which can open and close the air path, attached to a valve rod whose one end projects outward, and is configured with a push button, which allows the opening/closing valve to make an opening/closing movement, attached on the side of the end portion projecting outward of the valve rod.

Accordingly, when air is to be jetted by a push operation of the push button, it is difficult to adjust the amount of movement in pushing of the push button and therefore there is a disadvantage in that the jet flow rate of the air cannot be controlled.

[Object of the Device]

In view of the conventional disadvantage as described above, an object of the device is to obtain an air jet gun that allows the flow rate of air jetted from a nozzle part to be controlled by a simple operation, thereby allowing the air to be jetted with an arbitrary force.

[Means for achieving the object of the Device]

According to the present invention, an air jet gun being configured to allow air supplied from a compressor or the like to

be jetted from a leading end nozzle part by an opening/closing operation of an opening/closing valve device, is characterized by comprising a flow rate control mechanism that is provided for the opening/closing valve device and can control a flow rate of the air to be jetted from the nozzle part.

[Embodiments of the Device]

The present device is described in detail according to embodiments shown in the drawings as follows.

In an embodiment shown in FIGS. 1 to 3, numeral 1 indicates a pistol-shaped air jet gun body. In this air jet gun body 1, an air path 4 is formed, which communicates from the lower end portion of a holding part 2 to a nozzle part 3 located at the leading end, and air supplied from a compressor (not shown) can be jetted from the nozzle part 3.

Numerals 5 and 6 denote a connection socket that is connected to the compressor (not shown), which is attached to the air path 4 forming an opening at the lower end portion of the holding part 2 of the air jet gun body 1, through a hose 6.

Numerals 7 and 8 indicate an opening/closing valve device that is attached to a part on the upper part side of the holding part 2 of the air jet gun body 1 and opens and closes the air path 4 so as to allow the air supplied from the compressor (not shown in the figure) to be jetted from the nozzle part 3 or to be stopped. This opening/closing valve device 7 includes: a socket 10 that is screwed

together with and attached to the holding part 2 of the air jet gun body 1 and includes a valve seat body 9 formed integrally in its rear end portion that has a valve hole 8 to serve as a part of the air path 4 and is fitted and inserted into a horizontal portion 4a of the air path 4; a valve rod 11 slidably inserted and passed through the socket 10; an opening/closing valve 12 that is attached to the valve rod 11 in a position closer to its end portion on the inner side and closes up the valve hole 8 of the valve seat body 9 by coming into contact with a seat face of the valve seat body 9; and a push button 14 that is attached to the end portion on the outer side of the valve rod 11 and is energized by a spring 13 so that the opening/closing valve 12 is moved to open up the valve hole 8 through the push operation and a closing operation is executed through the release of the push operation. Note that a valve seat 12a made of rubber is stuck to the face of the opening/closing valve 12 that comes into contact with the seat face of the valve seat body 9, and thus the opening/closing valve 12 is configured to prevent air from leaking in the closed state.

Numerical 15 indicates a flow rate control mechanism that can control the flow rate of the air to be jetted from the nozzle part 3 provided for the opening/closing valve device 7. This flow rate control mechanism 15 includes: a tapered flow rate control valve 16 that is attached to a part of the valve rod 11 located in the valve hole 8 in the state where the valve hole 8 is closed up, in

which one end portion of the side of the opening/closing valve 12 has a diameter slightly smaller than that of the valve hole 8 and the other end portion has a diameter decreasing gradually; and a nut-like stopper 18 that is attached by being screwed together with a screw 17 provided for the outer peripheral portion of the leading end projecting outward of the socket 10 and can arbitrarily adjust the amount of movement in pushing of the push button 14.

Numeral 19 denotes a pistol's trigger-like control lever that is supported pivotably in an intermediate portion on the nozzle 3 side of the air jet gun body 1 and permits an opening/closing operation by the push button 14 of the opening/closing valve mechanism 7.

Numeral 20 indicates a cleaner that is attached to the leading end of the nozzle part 3 of the air jet gun body 1 and carries out suction removal or cleaning removal through blowing off of dirt, dust, and the like with air jetted from the nozzle part 3. This cleaner 20 includes: a suction pipe 22 for sucking dirt and the like that has an insertion hole 21 into which the leading end of the nozzle part 3 of the air jet gun body 1 is inserted; a dust bag 23 having air permeability that is attached to the suction pipe 22 on its downstream side and can contain dirt and the like; and an air path 26 provided with a selector valve 25 having a selector lever 24 formed so that air jetted from the nozzle part 3 inserted into the insertion hole 21 can be jetted into the suction pipe 22

in the direction of the attachment of the dust bag 23 or can be jetted from the leading end portion so as to blow off dirt and the like.

In an air jet gun 27 with the above-mentioned configuration, a hose 6 connected to a compressor (not shown) is connected to the connection socket 5 attached to the holding part 2.

Afterward, when the control lever 19 is operated as a trigger of a pistol is depressed, air can be jetted from the leading end nozzle part 3 as in the conventional case. At that time, when the force of the air thus jetted is too strong, the stopper 18 of the flow rate control mechanism 15 is moved to the side of the push button 14 of the opening/closing valve device 7 by a rotational operation as shown in FIGS. 2 and 3, whereby the amount of movement in pushing of the push button 14 is reduced. Thus, the flow rate of the air flowing to the nozzle part 3 side of the air path 4 is controlled by the flow rate control valve 16, whereby air with a force according to usage can be jetted.

As described above, when the cleaner 20 is attached to the nozzle part 3 of the air jet gun 27 that can control the air to be jetted from the nozzle part 3 and the selector lever 24 of the selector valve 25 is operated to be selected to allow the air jetted from the nozzle part 3 to flow to the suction pipe 22 side, air is jetted from the nozzle part 3 by the operation of the control lever 19 as described above, whereby dirt and the like can be sucked

from the suction pipe 22 to be contained in the dust bag.

Note that in this case, the cleaner 20 also can be used as a sampling tool.

In addition, by operating the selector lever 24, the air path 26 is selected so that air is jetted from the leading end side, whereby dirt and the like can be blown off at an arbitrary jetting pressure.

[Another Embodiment of the Device]

Next, the following description is directed to another embodiment of the present device shown in FIGS. 4 and 5. Note that in the description of this embodiment, the same components as those in the example of the present device described above are indicated with the same reference symbols and duplicated descriptions are omitted.

The embodiment shown in FIGS. 4 and 5 is mainly different from the embodiment of the present device described above in that a stopper 18A of a flow rate control device 15A is provided for a push button 14 of an opening/closing device 7 and a control lever is omitted so that the opening/closing operation of the opening/closing device 7 is carried out by a direct push operation of the push button 14 of the opening/closing device 7. An air jet gun 27A with such a configuration also may be applicable.

[Effects of the Device]

(1) Since the opening/closing device is provided with the flow

rate control mechanism that can control the flow rate of air to be jetted from the nozzle part, the air jet gun can be used in the state where the force of air to be jetted from the nozzle part is controlled according to the usage condition.

(2) Since the flow rate of air to be jetted can be controlled according to the item (1) described above, the air jet gun is applicable more widely than conventional one.

(3) The flow rate control mechanism includes: the tapered flow rate control valve that is attached to the valve rod, is provided with the opening/closing valve, and is the part of the opening/closing valve device located in the valve hole to serve as the air path; and a stopper that is attached so as to be able to be screwed to adjust the amount of movement in pushing of the push button that is attached to the end portion projecting outward of the valve rod and permits the opening/closing operation of the opening/closing valve by a push operation. Accordingly, the flow rate of air to be jetted from the nozzle part can be controlled by the stopper that can be screwed to adjust the amount of movement of the operation button for a push operation to an arbitrary amount of movement. Consequently, pushing the operation button until it comes to contact with the stopper allows the flow rate of air to be jetted to be set to a preset fixed flow rate. Therefore, the air jet gun can be operated easily and can be used easily without causing a feeling of fatigue in a finger operating the operation button.

In addition, air can be jetted while controlling the flow rate of air to be jetted through the adjustment of the amount of pushing of the operation button as in the conventional case.

Furthermore, since the flow rate of air to be jetted can be confirmed by the amount of pushing of the operation button, an optimum jet flow rate can be set easily.

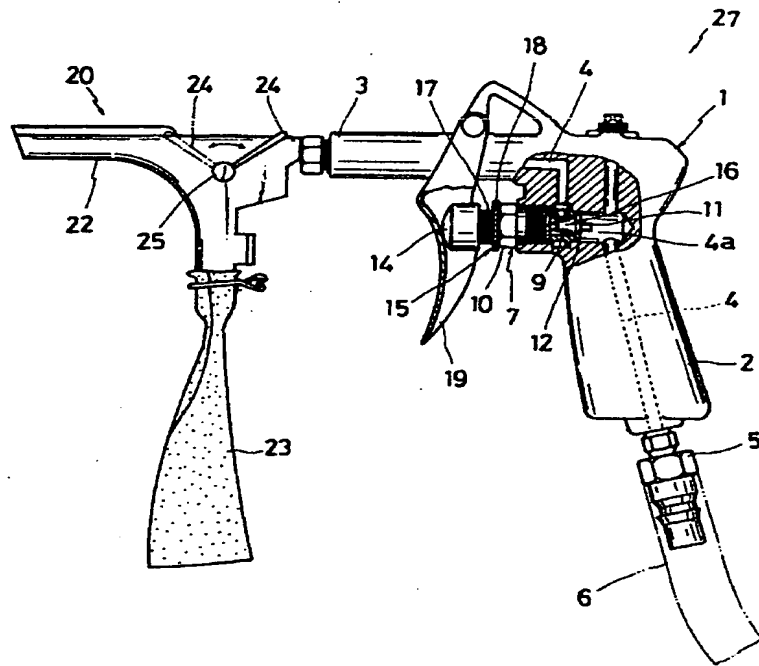
Brief Description of the Drawings

FIG. 1 is a drawing for explaining a state where a cleaner is attached, showing an embodiment of the present device; FIG. 2 is a drawing for explaining a state where air has been jetted; FIG. 3 is an enlarged sectional view of a main part; and FIGS. 4 and 5 are explanatory drawings showing another embodiment of the present device.

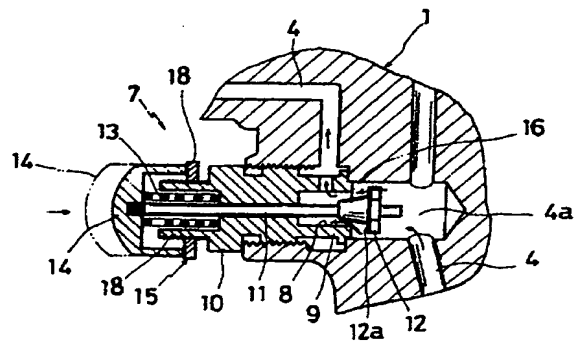
- 1 Pistol-shaped air jet gun body
- 2 Holding part
- 3 Nozzle part
- 4 Air path
- 5 Connection socket
- 6 Hose
- 7 Opening/closing valve device
- 8 Valve hole
- 9 Valve seat body
- 10 Socket

- 11 Valve rod
- 12 Opening/closing valve
- 13 Spring
- 14 Push button
- 15, 15A Flow control mechanism
- 16 Flow control valve
- 17 Screw
- 18, 18A Stopper
- 19 Control lever
- 20 Cleaner
- 21 Insertion hole
- 22 Suction pipe
- 23 Dust bag
- 24 Selector lever
- 25 Selector valve
- 26 Air path
- 27, 27A Air jet gun

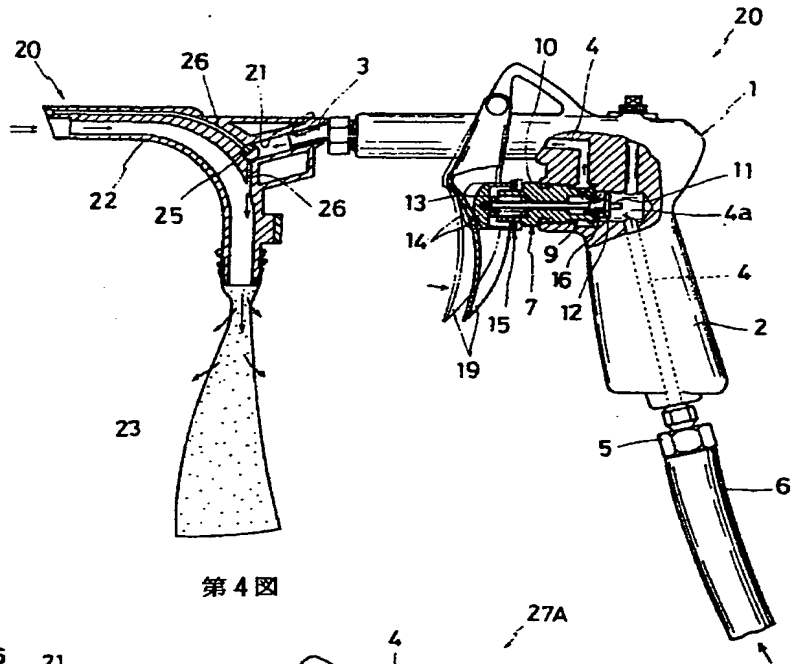
第1図



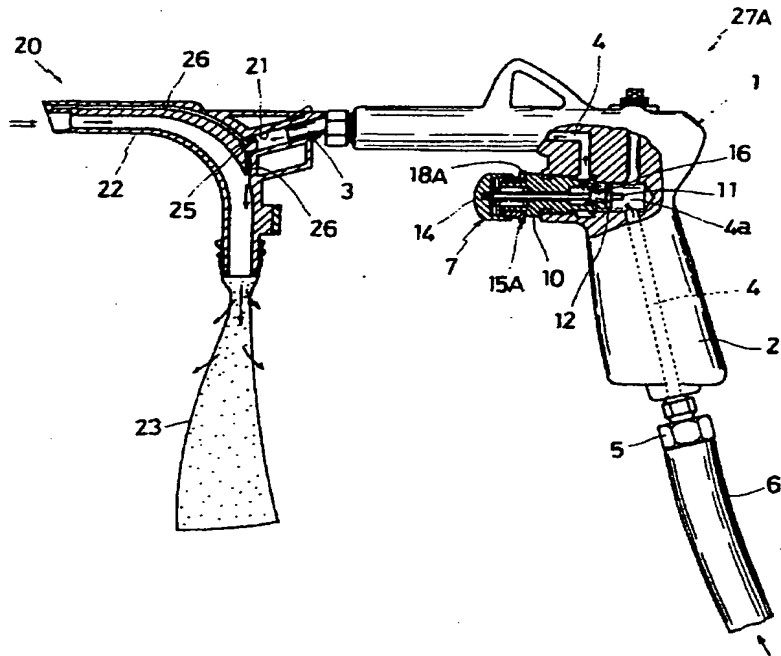
第3図



第2図



第4図



第5図

